XPS and XAS for Characterization of Carbon Materials

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Abstract

In the last few decades, advanced carbon materials, such as carbon nanotubes, carbon-like diamond (DLC) and graphene have been highly attractive because of their unique salient properties and promising applications. Advances in materials science and engineering essentially require reliable materials characterization techniques to provide true information of the investigated materials. This talk will cover the investigations of carbon materials by x-ray photoelectron spectroscopy (XPS) and soft x-ray absorption spectroscopy (XAS). The advantages and disadvantages of the two techniques for these materials will be elaborated. Since XPS is a surface sensitive technique, and thus the effects of surface contaminants on the measurement results cannot be avoided. Different methods to extract the information only from the interested materials will be demonstrated. Fluorescence-mode soft XAS, when used in addition to XPS, is one of the solutions to provide valuable information. The investigation of DLC by both XPS and XAS will be shown and discussed as an example.